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Lists of Species

Vascular flora in dry-shrub and wet grassland Cerrado seven years after a fire, Federal District, Brazil

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Abstract: Studies of temporal dynamics for grassland sites report that fire suppression plays a crucial role in floristic changes. The objective of this study was to verify whether after seven years without fire, communities showed variations in terms of composition, life forms, pollination and dispersal syndromes. The first survey (T0) was conducted from September 1999 to October 2000, while the second (T1) took place from August 2006 to August 2007. The floristic results in T1 were compared with the survey in T0 through the Sorensen similarity index and Chi-square tests. Over time, there were differences in the composition, life forms and pollination and dispersion syndromes. The evidence of changes suggests that the frequency of the fire regime can be considered the main agent for change in the flora of these communities.

Introduction

The dynamic process in a community is characterized by patterns, mechanisms and, in many systems, successive disturbances are important sources of changes in the landscape (Glenn-Lewin and van der Maarel 1992). The progression of changes in the composition and structure of a community over time, due to disturbances in the environment, is conceptualized as a succession process or directional change (Buchanan 1982).

Studies of temporal dynamics for grassland sites report that the suppression of disturbances such as fire plays a crucial role in the floristic and structural changes of these communities (San José and Fariñas 1991; Moreira 2000; Behling *et al.* 2007; Kahmen and Poschlod 2008; Ravi and D'Odorico 2009). Changes over time are related to differences in species abundance and composition, differences in the spectrum of life forms and functional characteristics. The suppression of fire in savannas intervenes in natural ecological processes, and in more open areas like grasslands, a gradual increase in the density of woody and fire-sensitive species can be seen (San José and Fariñas 1983; 1991; Silva *et al.* 2001; Durigan and Ratter 2006; Gardner 2006; Pinheiro and Durigan 2009).

Savannas are considered dynamic ecotones, distributed between grassland formations and more densely vegetated areas (Coutinho 1978, Roitman *et al.* 2008). In these landscapes grasses and trees coexist, influenced by interactions with the climate, soil and disturbances such as fire, and fluctuations in any of these factors may result in an increase in certain life forms (Roitman *et al.* 2008). The intensification or suppression of disturbances modifies the composition of species in an area. The landscape is altered by the exclusion of sensitive species in the first case, and by the exclusion of resistant species in the second (Libano and Felfili 2006).

In South America, the largest savanna region is located in Brazil, and is called Cerrado, and as in other savannas, the fire regime is an important factor in the evolution of the landscape and, consequently, of the vegetation (Gottsberger and Silberbauer-Gottsberger 2006a). In savannic physiognomies the presence of trees is greater in areas protected from fire, especially in dry-shrub savannas, where protection allows the regeneration of the woody component (Moreira 2000). In general, the absence of fire benefits the woody component and increases the structural complexity of vegetation, while the passage of fire benefits the non-woody component and increases the presence of herbs and subshrubs in the landscape (Mistry 1998).

In the Cerrado, most of the ongoing studies on dynamics have focused only on the tree layer (Libano and Felfili 2006; Aquino *et al.* 2007; Roitman *et al.* 2008, Carvalho and Felfili 2011). Studies that directly focus on understanding the temporal dynamics of the herbaceous and shrub layer over the years are still scarce, especially with regard to the grassland physiognomies of the biome (Eugênio *et al.* 2011).

The Cerrado phytogeographical domain has a very heterogeneous physiognomy, that ranges from open grasslands to dense forests, but which has as the most common formation the savannic physiognomy, known as cerrado *sensu stricto* (Oliveira-Filho and Ratter 2002; Ab'Sáber 2003; Ribeiro and Walter 2008). The grassland formations include wet grassland (campo limpo), dry-shrub grassland (campo sujo) and "campo rupestre" (rupiculous field grassland) (Ribeiro and Walter 2008), and until 2007 these occupied 7% of the entire Cerrado. In the Federal District alone, they covered a total of 6,164 ha (Sano *et al.* 2007).

The dry-shrub grassland (Campo sujo) is one of the

physiognomies of the Cerrado domain and is comprised exclusively by shrubs and herbaceous species, where variations in topography, soil, and humidity allow the establishment of subshrub-herbaceous species and also of some woody species found in adjacent cerrado areas (Ribeiro and Walter 2008). Wet grasslands (Campo limpo úmido) can be found in various topographic positions, with different variations in humidity, depth and soil fertility conditions (Munhoz *et al.* 2008). This physiognomy rarely occurs in flat areas with deep soils, but is common in Central Brazil, on the slopes of plateaus and alongside "veredas" (palm swampy vegetation) (Ribeiro and Walter 2008). The wet grasslands occur on the edge of gallery forests, seasonally flooded soils in valley bottoms, especially on hydromorphic soils and peaty organic soils (Felfili *et al.* 2005), with gradations of humidity and segments where the water table is shallow (Munhoz *et al.* 2008).

This paper reports on an ongoing monitoring project of the flora in an area of wet grassland and dry-shrub grassland, on the Água Limpa Farm, located in the south of the Federal District, Brazil. The study sites had experienced an accidental fire about a month before the first survey (1999-2001) (Munhoz and Felfili 2007a), and over a period of seven years there were no disturbances related to the fire regime. The main objectives were to verify whether after seven years without fire, the communities showed variation in their floristic composition, life forms, pollination and dispersal syndromes.

Materials and Methods

Study site

This study was conducted in adjacent wet grassland and dry-shrub grassland sites (Figure 1), both of approximately 16 ha, located on the Água Limpa Farm (ALF), (15°56' to 15°59' S and 47°55' to 47°58' WGr.), in the south of the Federal District, and owned by the University of Brasilia (UnB), comprising a core area of the Cerrado Biosphere Reserve.

The climate is Aw according to Köppen classification and is characterized by two well defined seasons: one that is hot and rainy (October to April) and the other cold and dry (May-September). In the study site the average annual maximum temperature is 28.5ºC with an average annual minimum of 12ºC. The average annual rainfall from November 1999 to April 2007 was 1,175 mm, measured at the meteorological station of the IBGE Ecological Reserve (RECOR), at a distance of approximately 5 km from the study site.

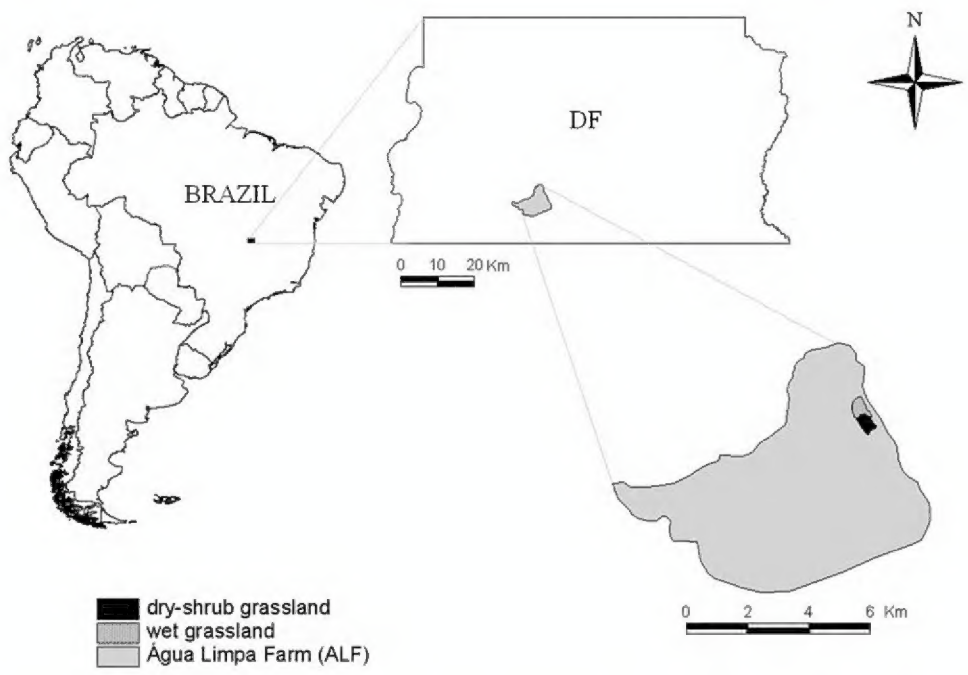

Figure 1. Location of Água Limpa Farm (ALF) in the south of Federal District, Brazil. The study areas are located in northeast at AFL.

The dry-shrub grassland in ALF occurs on an Oxisol of low fertility, with good drainage, deep groundwater and acid soil (pH 4.02), and high levels of Al^{+3} (0.35 cmolc.dm-^{3}), low levels of Ca^{2+} (0.35 cmolc.dm-^{3}), Mg^{2+} (0.12 cmolc.dm-^{3}) and P^{+} (1.14 cmolc.dm-^{3}) (Munhoz and Felfili 2006). The wet grassland adjacent to the dry-shrub grassland has a hydromorphic soil with a shallow water table, featuring areas of temporary flooding in the rainy season and permanent ones in the depressions. The wet grassland also features acid soil (pH 3.76), high levels of Al^{3+} (0.87 cmolc.dm-^{3}), low Ca^{2+} (0.22 cmolc.dm^{-3}), Mg^{2+} (0, 11 cmolc.dm^{-3}) and P^{+} (3.31 cmolc.dm^{-3}) (Munhoz *et al.* 2008).

Data collection

The study sites and the surrounding areas (gallery forest and cerrado *sensu stricto*) experienced an accidental fire in the first week of August 1999, about a month before the first survey (T0), carried out in the area on a fortnightly basis, from September 1999 to October 2000 (Munhoz and Felfili 2004; 2007a), but have never since suffered any disturbances related to the fire regime.

The second floristic survey (T1) was carried out twice a month from August 2006 to August 2007. In both studies, botanical materials in reproductive stage of all specimens with herbaceous, subshrub, shrub and nonwoody liana habits were collected along marked trails running parallel and perpendicular to the edge of the gallery forest stream Taquara, so as to cover the greatest possible extent of the site (Munhoz and Felfili 2004; 2007a).

The species collected were classified according to the main groups of plant life forms, following the terminology proposed by Raunkiaer (1934) and adapted by Ellenberg and Mueller-Dombois (1967). The taxonomic identification was performed by reference to the literature, comparison with specimens from the herbarium of the University of Brasilia (UB) and the Ecological Reserve of the Brazilian Institute of Geography and Statistics (IBGE) and subsequent confirmation by specialists in each taxonomic group. The specimens collected were herbalized according to the usual procedures, and stored in the herbaria mentioned above. Exotic species behaving as invasive in the study site were also collected for floristic records.

Species were classified into families based on the Angiosperm Phylogeny Group III system (APG III 2009), and through the Angiosperm Phylogeny Website (Stevens 2001). Author names for all species and synonyms were checked against The Plant List project page (2010) (http://www.theplantlist.org/).

Data Analysis

Floristic findings in T1 for the ALF wet and dry-shrub grasslands were compared with the T0 survey (Munhoz and Felfili 2004; 2007a), by means of the Sørensen Similarity Index. The floristic lists produced for both surveys was compiled into a single one, taking into account only Angiosperms. Life forms and the dispersal and pollination syndromes comprised the species matrix, classified for their presence and absence in T1 and T0. In order to classify the species as native and subspontaneous

(exotic) we used the information available in the Brazilian Flora Species List (http://floradobrasil.jbrj.gov.br/2012/index) and the recommendations suggested by Moro *et al.* (2012). The rare species were classified according to the list of rare plants in Brazil (Giulietti *et al*. 2009).

To verify that the categories of life forms, pollination and dispersal syndromes were significantly different over time and space, Chi-square (χ^2) tests were applied (Zar 1999).

To assess the similarity between surveys and between communities we used the Sørensen Similarity Index, based on the presence and absence of species (Mueller-Dombois and Ellenberg 1974). This index was calculated by means of the MVSP software, version 3.13 (Kovach Computing Services 2005).

Results and Discussion

After seven years without fire, changes in their floristic composition of the studied communities were verified (Figure 2A). There was an increase in the richness of species, families and genera (Figure 2A). Compared to the first survey, the number of species increased by 7.5% and 6% for the wet (campo limpo úmido) and dry-shrub (campo sujo) grassland, respectively. In both periods, the dry-shrub and wet grasslands had 35 species in common, while in the second survey only 24 such species were found. In the wet grassland, 101 species that were recorded after the 1999 fire were not found in 2006, and 124 settled in the area after seven years, while in the dry-shrub grassland, 101 disappeared and 134 emerged (Table 1). In total (T0 + T1) were listed 317 species for wet grassland and 394 species for the dry-shrub grassland. There was a record of 557 species adding the two areas.

The floristic similarity between the surveys in the dry-shrub grassland was 53.5%, while in the wet grassland it was 38.5%. Albeit adjacent, the floristic similarity between the sites is low, 30% in T0 and 33.6% in T1. The low similarity between communities in space and on different observation occasions suggests floristic distinctions between the wet and dry-shrub grasslands, with most species being typical of each area, with low sharing over the seven-year interval between the surveys .

The five families with the greatest number of species in the ALF wet and dry-shrub grassland sites were Asteraceae (91), Poaceae (75), Fabaceae (47), Melastomataceae (25) and Cyperaceae (23). The families Poaceae and Cyperaceae showed a reduction in the wealth of species -- the former in both sites and the latter only in the wet grassland. In the grassy-woody savanna of the Pantanal an increase in the number and frequency of the Cyperaceae's species and Eudicots was observed after fire (Cardoso *et al*. 2000), suggesting that its suppression could influence the decline in the richness of these species, as observed in the ALF wet grassland after seven years without the

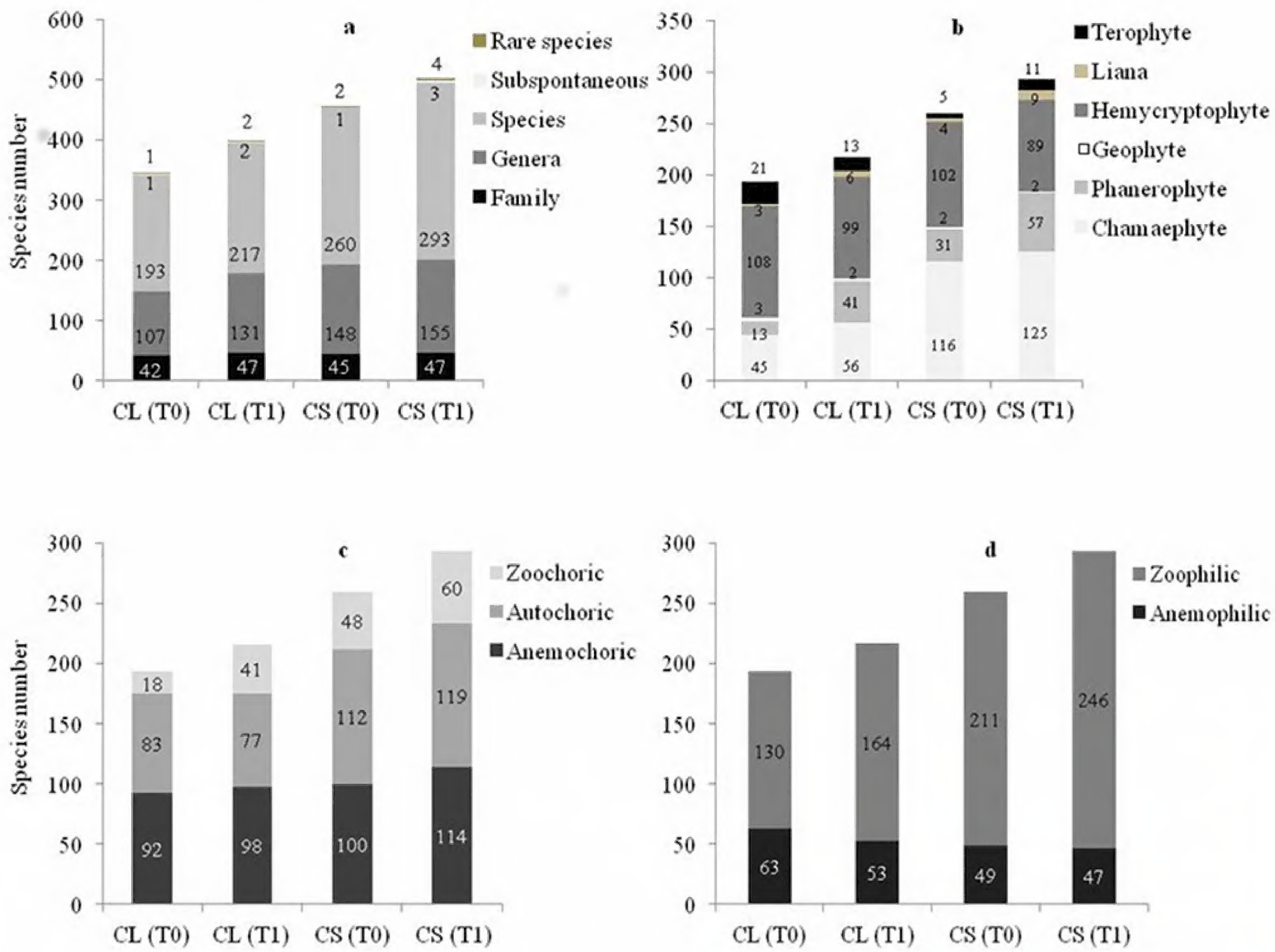

Figure 2. Floristic composition, life forms, pollination and dispersal syndromes of the species in the dry-shrub and wet grassland in T0 and T1 at Água Limpa Farm, (ALF), Brasília, DF, Brazil. (A) Number of species per family and genera and subspontaneous and rare species; (B) Number of species per life form; (C) Number of species per dispersal syndrome; (D) Number of species per pollination syndrome.

presence of fire. Over time, only Poaceae and Asteraceae were common to the two sites among the five families with the highest number of species. The Asteraceae and Poaceae typically feature greater variety, especially in the savanna and grassland physiognomies of the Cerrado, where they are virtually restricted to the herbaceous-subshrub component (Mantovani and Martins 1993; Batalha and Martins 2002; Munhoz and Felfili 2007a). The high colonization by individuals of these families is due to the fact that most species support direct sunlight and require high light intensity, conditions found in open areas, making these ideal places for their settlement (Tannus and Assis 2004). These two are also among the nine families deemed hyperdiverse in Brazil, since they feature at least a thousand species considered to be native (Rapini *et al.* 2009).

Significant differences were found in life forms between the wet and dry-shrub grasslands, both in T0 (χ^2 = 41.24, p = 8.39^{-08}) and in T1 (χ^2 = 12.61, p = 0.02). Over time, the dominant life forms in the communities were the hemicryptophytes and chamaephytes, the former predominating in the wet grassland and the latter in the dry-shrub grassland (Figure 2B). As time elapsed since the last fire, the number of phanerophyte species increased in both communities, and that of therophytes and hemicryptophytes dropped in wet grassland (Figure 2B). Over time, only the wet grassland showed significant differences in the number of species by life form (χ^2 = 19.51, p = 0.0015) due to the significant increase in phanerophytes and chamaephytes and reduction in hemicryptophytes and therophytes (Figure 2B). In the open savannas of Africa, the increase in shrubs determined a decline in the number of herbaceous species, after the suppression of fire (Belsky 1994; Duncan and Duncan 2000). The presence of shrubs and small trees in the landscape can change the phenology, composition, spatial distribution, biomass allocation and productivity of the herbaceous component (Scholes and Archer 1997). Shrub establishment, coverage and density cause changes in the soil and shading of herbs, resulting in the declining productivity of the latter (Scholes and Archer 1997).

As for the Cerrado, a gradual increase in tree coverage density has been recorded after years of vegetation protection against fire. In areas of savanna woodland (cerradão), cerrado *sensu stricto*, "campo cerrado" and shrub savanna (campo sujo), the absence of fires caused a significant increase in the number of woody species, with open areas showing the highest values, that is, the absence of disturbances allowed the settlement and regeneration of the woody component (Moreira 2000). After 44 years of protection from fire, the main change observed with satellite images in vegetation cover at the Assis Ecological Station, an area of Cerrado in southeastern Brazil, was the continuous thickening of vegetation, with open grassland areas being gradually occupied by closed cerrado physiognomies (Pinheiro and Durigan 2009). Protected since 1959, with the suppression of fire since 2004 in that area the wet grassland had its area reduced to one fourth of the initial extent, losing ground to the cerrado *sensu stricto* and riparian forests (Pinheiro and Durigan 2009). Apparently, in the ALF wet grassland these patterns described by Moreira (2000) and Pinheiro and Durigan (2009) can also be verified, whereby the exclusion of fire for seven years has encouraged the growth and settlement of phanerophytes and chamaephytes (woody component) and resulted in changes in the landscape due to the density of these shrubs.

The dispersal syndromes, anemochory and autocory remained dominant in the communities studied (Figure 2C). There were significant changes in the dispersal syndromes in the wet grassland over time (χ^2 = 7.93, p = 0.01), with a reduction in autochorous species and an increase in zoochoric ones (Figure 2C). The dispersion syndromes of the wet and dry-shrub grasslands were significantly different in T0 (χ^2 = 8.56, p = 0.01) but not in T1 (χ^2 = 2.03, p = 0.36), suggesting that over time and space a functional strategy of dispersal syndrome convergence occurred between the adjacent areas.

Zoophily was the dominant pollination syndrome in the communities in both surveys (Figure 1d), with increases of 8.6% in the wet grassland and approximately 3% in the dry-shrub grassland. There was a general reduction in the number of anemophilous species: in the wet grassland this decrease was of 8.1% and in the dry-shrub grassland, 2.8% (Figure 2D). Over time, only the wet grassland (χ^2 = 3.40, p = 0.05) showed significant differences in pollination syndromes, due to the increase in the number of zoochoric species between surveys and the decrease in anemophilous species (Figure 2D).

The predominance of anemochoric dispersion over time is associated to the physiognomic types of the sites, which are open grasslands, and the dominance of herbaceous species, a pattern observed in other studies on the Cerrado (Batalha *et al.* 1997; Batalha and Mantovani 2000; Tannus *et al.* 2006), and in this dry-shrub grassland seven years ago (Munhoz and Felfili 2007b), but increased zoochory may be another factor to confirm the influence of the absence of fire in the changes found in the landscape over time, especially in the ALF wet grassland, where after years of fire protection a greater density of chamaephytes and phanerophytes was verified. The prevalence of the zoochoric dispersal syndrome in different environments is associated with the dominance of woody species (phanerophytes and chamaephytes), as occurs in the cerrado *sensu stricto* and forest habitats (Batalha and Mantovani 2000; Kinoshita *et al.* 2006; Tannus and Assis 2006; Ishara and Maimoni-Rodella 2011).

The conditions of more open vegetation and the dominance of one layer composed of herbs, besides benefiting the presence of wind-dispersed species also favor a high frequency of anemophilous species (Gottsberger and Silberbauer-Gottsberger 2006b; Barbosa and Sazima 2008; Ishara and Maimoni-Rodella 2011), which in the ALF wet and dry-shrub grasslands showed a reduction over time in the studied communities. This anemophily reduction is associated with the exclusion of fire for seven years, since the reproductive behavior of some grasses, a group to which belong most of the species pollinated by wind, is dependent on fire, so few species flourish in the absence of this type of disorder (Sarmiento 1992; Canales *et al.* 1994; Munhoz and Amaral 2010). The proportions and occurrences of different pollination systems are affected by differences in floristic composition (Ramírez 1989).

Seven species found in the ALF site are on the list of Rare Plants of Brazil (Giulietti *et al.* 2009): *Wedelia souzae* H. Rob. (Asteraceae); *Lobelia brasiliensis* A.O.S. Vieira and G.J. Shep. (Campanulaceae); *Hyptis loeseneriana* Pilg. (Lamiaceae); *Hyptis tenuifolia* Epling (Lamiaceae); *Polygala juncea* A.St.-Hil. (Polygalaceae); *Spermacoce irwiniana* (E.L. Cabral) Delprete (Rubiaceae) and *Xyris diaphanobracteata* Kral and Wand. (Xyridaceae) while *W. souzae*, *L. brasiliensis*, *H.loeseneriana* e *X.diaphanobracteata* only settled in the sites after fire suppression, *P. juncea* was listed after the fire only. This species flowers and fruits from November to May, and flowering is intense especially after fires (Marques 1988). *H.tenuifolia* e *S. irwiniana* were recorded in both surveys. *H. tenuifolia* occurred for a short period in the ALF dry-shrub grassland, and was recorded seven months after the fire, in the month of April during the dry season of 2000 (Munhoz and Felfili 2006). These plants were considered rare, since they have a restricted range of occurrence (<10,000 km^2) and therefore meet criteria B1 and D2 of the IUCN (International Union for the Conservation of Nature), that is, in terms of the first criterion they can be classified as threatened depending on the number of locations or fragmentation and if they experience decline and/or extreme fluctuations regarding the boundaries of occurrence, area of occupancy, environmental conditions, number of locations or subpopulations, and/or number of mature individuals; and for the second criterion, these species can be considered endangered in the near future (Rapini *et al.* 2009).

Three species were classified as subspontaneous to the flora of the Brazil (Brazilian Flora Species List 2012) (Table 1). *Clibadium armanii* (Balb.) Sch. Bip. ex O.E. Schulz (Asteraceae) e *Melinis minutiflora* P. Beauv (Poaceae) were recorded only after some distance from fire and only *Melinis repens* (Willd.) Zizka (Poaceae) appeared in all surveys (Table 1). After seven years of fire the grass *Melinis minutiflora* P. Beauv. settled in the ALF dry-shrub grassland was listed among the species with the highest percentage of coverage (A.G. Amaral, unpublished data). *M. minutiflora* is sensitive to fire and is adapted to low soil fertility (Martins *et al.* 2004), a condition found in the ALF dry-shrub grassland for its settlement and proliferation alongside the absence of fire for seven years. As a consequence of high competitive power, ample plant growth and a vast production of viable seeds, the species *M. minutiflora* has become a threat to the conservation of the biome's flora (Filgueiras 1991; Martins *et al.* 2004).

For the herb-shrub layer of the dry-shrub grassland, and particularly in the ALF wet grassland, the evidence found in changes related to composition, life forms and pollination and dispersal syndromes, point to a process of succession in these communities, generated by the exclusion of fire for seven years. For these environments, the frequency of the fire regime can be considered the main agent of change in the composition, life forms and phenology of species.

Table 1. Families, genera and species according the life form (LF) proposed by Raunkiaer (1934) and adapted by Ellenberg and Mueller-Dombois (1967), dispersal syndrome (DS) and pollination syndrome (PS) in a campo sujo (CS), dry-shrub grassland, and a campo limpo úmido (CL), wet grassland, in 1999-2000 (T0) and 2006-2007 (T1), in the Água Limpa Farm, Federal District, Brazil. Legend: cham=chamaephyte; geo=geophyte; hem=hemicryptophyte; ph=phanerophyte; lia=liana; ter=terophyte; autoc= autochoric; zooc= zoochoric; anemoc= anemochoric; zoo= zoophilic; ane= anemophilic;*subspontaneous species; +rare species; CM= C. Munhoz; AA= A. Amaral.

SPECIES	VOUCHER	CLT0	CLT1	CST0	CST1	Habit	LF	DS	PS
Acanthaceae									
Justicia oncodes (Lindau) Wassh. and C. Ezcurra	CM1058	-	-	1	-	herb	hem	autoc	zoo
Justicia phyllocalyx (Lindau) Wassh. and C. Ezcurra	AA617	-	-	1	1	herb	hem	autoc	zoo
Justicia pycnophylla Lindau	AA696	1	-	1	1	subshrub	cham	autoc	zoo
Ruellia brevicaulis (Nees) Lindau	CM2076	-	-	1	-	subshrub	cham	autoc	zoo
Ruellia incomta (Nees) Lindau	AA58	1	-	1	1	subshrub	cham	autoc	zoo
Ruellia sp.	AA1230	-	-	-	1	subshrub	cham	autoc	zoo
Alstroemeriaceae									
Alstroemeria burchellii Baker	AA232	-	1	-	-	herb	geo	autoc	zoo
Alstroemeria gardneri Baker	AA822	-	-	-	1	herb	geo	autoc	zoo
Alstroemeria longistyla Schenk	CM956	1	-	-	-	herb	geo	autoc	zoo
Alstroemeria sp.	CM1460	-	-	1	-	herb	hem	autoc	zoo
Amaranthaceae									
Gomphrena aphylla Pohl ex Moq.	CM741	1	-	-	-	subshrub	cham	autoc	zoo
Pfaffia jubata Mart.	CM890	1	-	1	-	subshrub	cham	autoc	zoo
Anacardiaceae									
Anacardium humile A. St.-Hil.	AA92	-	1	-	1	shrub	ph	zooc	zoo
Apiaceae									
Eryngium juncifolium (Urb.) Mathias and Constance	AA48	-	1	1	1	herb	hem	autoc	zoo
Eryngium marginatum Pohl ex Urb.	CM812	1	-	1	-	herb	hem	autoc	zoo
Eryngium sp.	CM2096	1	-	-	-	herb	hem	autoc	zoo
Apocynaceae									
Asclepias candida Vell.	CM2078	1	-	1	-	herb	hem	anemoc	zoo
Ditassa cordata (Turcz.) Fontella	AA1433	1	1	-	-	subshrub	cham	anemoc	zoo
Ditassa sp.	CM2298	-	-	1	-	subshrub	cham	autoc	zoo
Mandevilla longiflora (Desf.) Pichon	CM2053	-	-	1	-	subshrub	cham	anemoc	zoo
Mandevilla novocapitalis Markgr.	AA393	-	-	-	1	subshrub	cham	autoc	zoo
Mandevilla rugosa (Benth.) Woodson	AA347	1	-	-	1	vine	lia	anemoc	zoo

Table 1. *Continued.*

SPECIES	VOUCHER	CLT0	CLT1	CST0	CST1	Habit	LF	DS	PS
Mandevilla velame (A. St.-Hil.) Pichon	AA1636	-	-	1	1	subshrub	cham	anemoc	zoo
Oxypetalum aequaliflorum E. Fourn.	AA535	1	-	-	1	herb	hem	anemoc	zoo
Oxypetalum appendiculatum Mart.	AA145	-	1	-	-	vine	lia	anemoc	zoo
Oxypetalum erectum Mart.	AA407	-	-	1	1	subshrub	cham	anemoc	zoo
Asteraceae									
Achyrocline alata (Kunth) DC.	CM1187	1	-	-	-	subshrub	cham	anemoc	zoo
Achyrocline satureioides (Lam.) DC.	AA40	-	1	-	1	herb	hem	anemoc	zoo
Ageratum conyzoides (L.) L.	AA547	-	1	-	-	subshrub	cham	anemoc	zoo
Apopyros warmingii (Baker) G.L. Nesom	CM1936	-	-	1	-	subshrub	cham	anemoc	zoo
Aspilia foliacea (Spreng.) Baker	AA258	1	1	1	1	herb	hem	anemoc	zoo
Aspilia jolyana G.M. Barroso	AA45	-	-	1	1	shrub	cham	anemoc	zoo
Aspilia montevidensis (Spreng.) Kuntze	AA495	-	-	-	1	herb	hem	anemoc	zoo
Aspilia ovalifolia (DC.) Baker	AA709	-	-	-	1	subshrub	cham	anemoc	zoo
Aspilia platyphylla (Baker) S.F. Blake	CM2173	-	-	1	-	subshrub	cham	anemoc	zoo
Aspilia reflexa (Sch.Bip. ex Baker) Baker	CM839	-	-	1	-	herb	hem	anemoc	zoo
Aspilia sp.	CM2237	-	-	1	-	subshrub	cham	autoc	zoo
Ayapana amygdalina (Lam.) R.M. King and H. Rob.	AA49	-	1	-	1	subshrub	cham	anemoc	zoo
Baccharis erigeroides DC.	CM2013	1	-	-	-	subshrub	cham	anemoc	zoo
Baccharis rufescens var. *ventanicola* Cabrera	AA62	-	-	1	1	subshrub	cham	anemoc	zoo
Baccharis subdentata DC.	CM959	1	-	-	-	subshrub	cham	anemoc	zoo
Baccharis sp.1	AA1933	-	-	1	1	subshrub	cham	anemoc	zoo
Baccharis sp.2	AA834	-	1	-	1	subshrub	cham	anemoc	zoo
Bidens graveolens Mart.	AA750	-	-	1	1	subshrub	cham	anemoc	zoo
Calea cuneifolia DC.	AA504	-	-	1	1	subshrub	cham	anemoc	zoo
Calea fruticosa (Gardner) Urbatsch, Zlotsky and Pruski	CM1341	-	-	1	-	shrub	ph	anemoc	zoo
Calea gardneriana Baker	CM1941	1	-	1	-	herb	Hem	anemoc	zoo
Calea hymenolepis Baker	AA1105	-	-	-	1	subshrub	cham	anemoc	zoo
Calea lantanoides Gardner	AA1786	-	-	-	1	subshrub	cham	anemoc	zoo
Calea mediterranea (Vell.) Pruski	CM792	1	-	1	-	subshrub	cham	anemoc	zoo
Calea quadrifolia Pruski and Urbatsch	AA873	-	-	-	1	subshrub	cham	anemoc	zoo
Campuloclinium hirsutum Gardner	AA1197	-	1	-	-	herb	hem	anemoc	zoo
Chaptalia integerrima (Vell.) Burkart	AA425	-	-	1	1	herb	hem	anemoc	zoo
Chresta sphaerocephala DC.	AA20	-	1	1	1	shrub	ph	anemoc	zoo
Chromolaena chaseae (B.L. Rob.) R. M. King and H.Rob.	AA26	-	-	1	1	subshrub	cham	anemoc	zoo
Chromolaena horminoides DC.	AA1770	-	-	-	1	herb	hem	anemoc	zoo
Chromolaena laevigata (Lam.) R. M. King and H.Rob	AA1256	-	1	-	1	shrub	ph	anemoc	zoo
Chromolaena maximiliani (Schrad. ex DC.) R.M. King and H.Rob	AA1849	-	1	-	-	subshrub	cham	anemoc	zoo
Chromolaena vindex (DC.) R.M.King and H.Rob.	AA1257	1	-	-	1	herb	hem	anemoc	zoo
Chrysanthemum morifolium Ramat.	CM1674	-	-	1	-	subshrub	cham	anemoc	zoo
Clibadium armanii (Balb.) Sch. Bip. ex O.E. Schulz *	AA1095	-	1	-	1	shrub	ph	anemoc	zoo
Dimerostemma asperatum S.F. Blake	CM843	-	-	1	-	subshrub	cham	anemoc	zoo
Dimerostemma brasilianum Cass.	AA639	-	-	-	1	shrub	ph	anemoc	zoo
Echinocoryne holosericea (Mart.) H. Rob.	AA102	-	-	-	1	shrub	ph	anemoc	zoo
Echinocoryne stricta (Gardner) H. Rob.	AA426	-	-	-	1	subshrub	cham	anemoc	zoo
Elephantopus elongatus Gardner	AA893	1	1	-	1	shrub	ph	anemoc	zoo
Emilia fosbergii Nicolson	AA1761	-	1	1	1	herb	ter	anemoc	zoo
Erechtites hieraciifolius (L.) Raf. ex DC.	AA1557	-	1	-	1	herb	ter	anemoc	zoo
Eremanthus mollis Sch. Bip.	AA948	-	-	-	1	shrub	ph	anemoc	zoo
Eupatorium macrocephalum Less.	AA391	-	-	-	1	herb	hem	anemoc	zoo
Eupatorium megacephalum Mart. ex Baker	AA748	-	-	1	1	subshrub	cham	anemoc	zoo
Eupatorium stachyophyllum Spreng.	CM2133	-	-	1	-	subshrub	cham	anemoc	zoo
Eupatorium tremulum Hook. and Arn.	AA1068	-	1	-	-	shrub	ph	anemoc	zoo
Eupatorium sp.	CM783	-	-	1	-	subshrub	cham	anemoc	zoo
Ichthyothere latifolia Baker	AA521	1	1	1	1	subshrub	cham	anemoc	zoo
Lepidaploa aurea (Mart. ex DC.) H. Rob.	AA33	-	1	1	1	subshrub	cham	anemoc	zoo
Lessingianthus argyrophyllus (Less.) H. Rob.	AA34	-	-	1	1	subshrub	cham	anemoc	zoo
Lessingianthus bardanoides (Less.) H. Rob.	AA702	-	-	1	1	subshrub	cham	anemoc	zoo
Lessingianthus compactiflorus (Mart. ex Baker) H. Rob.	AA17	-	-	-	1	subshrub	cham	anemoc	zoo
Lessingianthus desertorum (Mart. ex DC.) H.Rob.	CM1859	1	-	-	-	subshrub	cham	anemoc	zoo
Lessingianthus durus (Mart. ex DC.) H. Rob.	AA260	-	-	1	1	subshrub	cham	anemoc	zoo

Table 1. *Continued.*

SPECIES	VOUCHER	CLT0	CLT1	CST0	CST1	Habit	LF	DS	PS
Lessingianthus erythrophilus (DC.) H. Rob.	AA421	-	1	-	1	subshrub	cham	anemoc	zoo
Lessingianthus grearii (H.Rob.) H.Rob.	CM889	1	-	-	-	subshrub	cham	anemoc	zoo
Lessingianthus ligulifolius (Mart. ex DC.) H. Rob.	AA720	-	-	-	1	subshrub	cham	anemoc	zoo
Lessingianthus linearifolius (Less.) H.Rob.	CM1697	1	-	-	-	subshrub	cham	anemoc	zoo
Lessingianthus psilophyllus (DC.) H. Rob.	AA1194	-	1	-	-	subshrub	cham	anemoc	zoo
Lessingianthus simplex (Less.) H.Rob.	AA327	1	-	1	1	subshrub	cham	anemoc	zoo
Mikania sessilifolia DC.	CM1661	-	-	1	-	subshrub	cham	anemoc	zoo
Podocoma sp.	AA494	-	-	-	1	subshrub	cham	anemoc	zoo
Porophyllum angustissimum Gardner	CM1357	-	-	1	-	subshrub	cham	anemoc	zoo
Porophyllum lanceolatum DC.	CM1043	-	-	1	-	shrub	ph	anemoc	zoo
Praxelis kleinioides (Kunth) Sch. Bip.	AA1197	-	1	-	-	herb	hem	anemoc	zoo
Praxelis sp.	AA205	-	1	-	-	subshrub	cham	anemoc	zoo
Riencourtia oblongifolia Gardner	AA519	1	1	1	1	subshrub	cham	anemoc	zoo
Senecio adamantinus Bong.	AA366	-	1	-	-	herb	hem	anemoc	zoo
Senecio sp.	AA451	-	1	-	-	subshrub	cham	anemoc	zoo
Soaresia velutina Sch. Bip.	AA1390	-	-	-	1	herb	hem	anemoc	zoo
Stevia heptachaeta DC.	AA1366	1	1	1	1	herb	hem	anemoc	zoo
Stevia sp.	AA815	-	-	1	1	subshrub	cham	anemoc	zoo
Symphyopappus reticulatus Baker	AA590	-	1	-	-	shrub	ph	anemoc	zoo
Trichogonia salviifolia Gardner	AA472	-	-	-	1	herb	hem	anemoc	zoo
Trichogonia sp.	CM986	1	-	-	-	herb	hem	anemoc	zoo
Trixis glutinosa D. Don	AA18	-	-	1	1	shrub	ph	anemoc	zoo
Trixis nobilis (Vell.) Katinas	AA1363	-	1	-	1	subshrub	cham	anemoc	zoo
Vernonanthura ferruginea (Less.) H. Rob	AA27	-	-	-	1	shrub	ph	anemoc	zoo
Vernonanthura membranacea (Gardner) H. Rob.	AA1775	-	-	-	1	subshrub	cham	anemoc	zoo
Vernonanthura phosphorica (Vell.) H.Rob.	CM1366	-	-	1	-	shrub	ph	anemoc	zoo
Vernonia megapotamica Spreng.	AA634	-	-	1	1	subshrub	cham	anemoc	zoo
Vernonia rubriramea Mart. ex DC.	AA184	-	-	-	1	subshrub	cham	anemoc	zoo
Viguiera bracteata Gardner	AA259	-	1	1	1	subshrub	cham	anemoc	zoo
Viguiera discolor Baker	AA592	-	1	-	-	subshrub	cham	anemoc	zoo
Viguiera kunthiana Gardner	AA1604	-	1	-	-	herb	hem	anemoc	zoo
Viguiera robusta Gardner	AA400	-	-	1	1	subshrub	cham	anemoc	zoo
Viguiera sp.	CM917	-	-	1	-	subshrub	cham	anemoc	zoo
Wedelia bishopii H. Rob.	CM839	1	-	1	-	herb	hem	anemoc	zoo
Wedelia souzae H. Rob.[+]	AA1263	-	-	-	1	shrub	ph	anemoc	zoo
Willoughbya officinalis (Mart.) Kuntze	AA868	1	1	-	1	subshrub	cham	anemoc	zoo
Begoniaceae									
Begonia cucullata Willd.	AA1199	-	1	-	-	herb	ter	autoc	zoo
Bignoniaceae									
Adenocalymma pedunculatum (Vell.) L.G.Lohmann	AA1015	-	-	-	1	subshrub	cham	anemoc	zoo
Anemopaegma arvense (Vell.) Stellfeld ex de Souza	CM782	-	-	1	-	subshrub	cham	anemoc	zoo
Anemopaegma glaucum Mart. ex DC.	AA1274	-	-	1	1	subshrub	cham	anemoc	zoo
Jacaranda caroba (Vell.) A. DC.	AA1878	-	1	-	-	shrub	ph	anemoc	zoo
Jacaranda ulei Bureau and K. Schum.	s/no	-	-	1	-	shrub	ph	anemoc	zoo
Zeyheria montana Mart.	AA1016	-	-	-	1	shrub	ph	anemoc	zoo
Boraginaceae									
Cordia calocephala Cham.	AA480	1	-	1	1	shrub	ph	autoc	zoo
Heliotropium salicioides Cham.	AA51	-	-	1	1	subshrub	cham	autoc	zoo
Burmanniaceae									
Burmannia flava Mart.	CM1003	1	-	-	-	herb	ter	autoc	zoo
Campanulaceae									
Lobelia brasiliensis A.O.S. Vieira and G.J.Shepherd[+]	AA356	-	1	-	-	shrub	ph	anemoc	zoo
Lobelia camporum Pohl	CM1896	1	1	1	-	herb	hem	anemoc	zoo
Chrysobalanaceae									
Parinari obtusifolia Hook. f.	AA21	1	-	1	1	subshrub	cham	zooc	zoo
Clusiaceae									
Kielmeyera abdita Saddi	AA24	-	1	1	1	subshrub	cham	anemoc	zoo
Kielmeyera variabilis Mart. and Zucc.	CM864	-	-	1	-	shrub	ph	anemoc	zoo
Convolvulaceae									
Evolvulus lagopodioides Meisn.	AA82	-	-	1	1	herb	hem	anemoc	zoo

Table 1. *Continued.*

SPECIES	VOUCHER	CLT0	CLT1	CST0	CST1	Habit	LF	DS	PS
Ipomoea aurifolia Dammer	AA392	-	-	-	1	subshrub	cham	autoc	zoo
Ipomoea campestris Meisn.	AA499	-	1	1	1	herb	hem	autoc	zoo
Ipomoea geophylifolia K. Afzelius	AA593	-	1	-	-	vine	lia	autoc	zoo
Ipomoea procumbens Mart. and Choisy	AA972	-	-	-	1	vine	lia	autoc	zoo
Ipomoea procurrens Meisn.	AA507	1	-	1	1	vine	lia	autoc	zoo
Ipomoea sp.	CM2163	-	-	1	-	vine	lia	autoc	zoo
Merremia contorquens (Choisy) Hallier f.	AA66	-	-	-	1	vine	lia	autoc	zoo
Merremia digitata var. *ericoides* (Meisn.) D.F. Austin and Staples	AA1400	-	-	-	1	vine	lia	autoc	zoo
Cucurbitaceae									
Cayaponia weddellii (Naudin) Cogn.	AA1076	-	1	-	-	vine	lia	zooc	zoo
Cyperaceae									
Ascolepis brasiliensis (Kunth) Benth. ex C.B. Clarke	CM2039	1	-	-	-	herb	ter	anemoc	ane
Bulbostylis capillaris (L.) Kunth ex C.B.Clarke	CM1191	1	-	-	-	herb	ter	anemoc	ane
Bulbostylis jacobinae (Steud.) Lindm.	AA659	-	-	-	1	herb	hem	anemoc	ane
Bulbostylis junciformis (Kunth) C.B. Clarke	AA536	1	1	1	1	herb	hem	anemoc	ane
Bulbostylis juncoides (Vahl) Kük. ex Herter	CM2174	-	-	1	-	herb	hem	anemoc	ane
Bulbostylis paradoxa (Spreng.) Lindm.	s/no	-	-	1	-	herb	hem	anemoc	ane
Bulbostylis paraensis C.B. Clarke	CM828	1	-	-	-	herb	hem	anemoc	ane
Bulbostylis sellowiana (Kunth) Palla	AA143	1	1	-	-	herb	hem	anemoc	ane
Bulbostylis sp. CL	AA1753	-	1	-	-	herb	hem	anemoc	ane
Bulbostylis sp. CS	CM729	-	-	1	-	herb	hem	anemoc	ane
Lagenocarpus rigidus (Kunth) Nees	AA379	1	1	-	-	herb	hem	anemoc	ane
Lagenocarpus rigidus subsp. *tenuifolius* (Boeckeler) T. Koyama and Maguire	AA568a	-	1	-	-	herb	hem	anemoc	ane
Rhynchospora cf. *albiceps* Kunth	CM888	1	-	-	-	herb	hem	anemoc	ane
Rhynchospora brasiliensis Boeckeler	CM948	1	-	-	-	herb	hem	anemoc	ane
Rhynchospora consaguinea (Kunth) Boeckeler	AA275	1	1	1	1	herb	hem	anemoc	ane
Rhynchospora emaciata (Nees.) Boeckeler	AA566	1	1	-	-	herb	hem	anemoc	ane
Rhynchospora gigantea Link	CM1293	1	-	-	-	herb	hem	anemoc	ane
*Rhynchospora globosa (*Kunth) Roem. and Schult.	AA117	1	1	-	1	herb	hem	autoc	ane
Rhynchospora marisculus Lindl. and Nees.	AA609	1	1	-	-	herb	hem	anemoc	ane
Rhynchospora patuligluma C.B.Clarke ex Lindm.	CM2302	-	-	1	-	herb	hem	anemoc	ane
Rhynchospora robusta (Kunth) Boeckeler	AA235	1	1	-	-	herb	hem	anemoc	ane
Rhynchospora rugosa (Vahl) Gale	AA47	1	1	-	1	herb	hem	anemoc	ane
Rhynchospora spruceana C.B. Clarke	AA680	1	1	-	-	herb	hem	autoc	ane
Rhynchospora tenuis Link	AA901	1	1	-	-	herb	hem	autoc	ane
Rhynchospora velutina (Kunth) Boeckeler	AA1336	1	1	-	1	herb	hem	autoc	ane
Rhynchospora sp.1	CM826	1	-	-	-	herb	hem	autoc	ane
Rhynchospora sp.2	CM1594	1	-	-	-	herb	hem	autoc	ane
Rhynchospora sp.3	CM2212	1	-	-	-	herb	hem	autoc	ane
Rhynchospora sp.4	AA1613	-	1	-	-	herb	hem	autoc	ane
Scleria hirtella Sw.	CM1064	1	1	1	-	herb	hem	autoc	ane
Scleria leptostachya Kunth	AA816	1	1	-	1	herb	ter	autoc	ane
Scleria scabra Willd.	AA1151	-	-	-	1	herb	ter	autoc	ane
Scleria sp.	CM898	1	-	-	-	herb	hem	autoc	ane
Dilleniaceae									
Davilla elliptica A. St.-Hil.	AA1265	-	-	1	1	shrub	ph	zooc	zoo
Droseraceae									
Drosera montana A. St.-Hil.	AA820	1	1	-	1	herb	hem	autoc	zoo
Ericaceae									
Agarista chlorantha (Cham.) G. Don	AA124	-	1	-	-	subshrub	cham	autoc	zoo
Ericaceae									
Gaylussacia goyazensis Sleumer	AA80	-	1	-	1	shrub	ph	zooc	zoo
Gaylussacia sp.	AA1701	-	1	-	-	shrub	ph	zooc	zoo
Eriocaulaceae									
Eriocaulon modestum Kunth	CM1584	1	-	-	-	herb	hem	anemoc	ane
Paepalanthus eriocauloides Ruhland	CM1480	1	-	-	-	herb	ter	anemoc	zoo
Paepalanthus flaccidus (Bong.) Kunth	AA1052	1	1	-	-	herb	hem	anemoc	zoo
Paepalanthus giganteus Sano	AA198	-	-	1	1	herb	hem	anemoc	zoo
Paepalanthus lundii Körn.	CM1858	1	-	-	-	herb	hem	anemoc	zoo

TABLE 1. *CONTINUED.*

SPECIES	VOUCHER	CLT0	CLT1	CST0	CST1	Habit	LF	DS	PS
Paepalanthus cf. *speciosus* Gardner	CM1599	1	-	-	-	herb	hem	anemoc	zoo
Syngonanthus densiflorus (Korn.) Ruhland	AA283	1	1	-	-	herb	hem	autoc	zoo
Syngonanthus gracilis (Bong.) Ruhland	AA282	1	1	-	-	herb	ter	autoc	zoo
Syngonanthus nitens (Bong.) Ruhland	AA1606	1	1	-	-	herb	hem	autoc	zoo
Syngonanthus xeranthemoides (Bong.) Ruhland	CM2220	1	-	1	-	herb	hem	autoc	zoo
Syngonanthus sp.1	CM1817	1	-	-	-	herb	hem	autoc	zoo
Syngonanthus sp.2	CM1580	1	-	-	-	herb	hem	autoc	zoo
Erythroxylaceae									
Erythroxylum campestre A. St.-Hil	AA50	-	-	1	1	subshrub	cham	zooc	zoo
Erythroxylum deciduum A. St.-Hil.	AA156	1	-	1	1	shrub	ph	zooc	zoo
Erythroxylum suberosum A. St.-Hil.	AA1000	-	-	-	1	shrub	ph	zooc	zoo
Erythroxylum tortuosum Mart.	CM1872	-	-	1	-	shrub	ph	zooc	zoo
Euphorbiaceae									
Acalypha claussenii (Turcz.) Müll.Arg.	CM2052	1	-	1	-	herb	hem	autoc	zoo
Croton antisyphiliticus Mart.	AA157	1	-	1	1	subshrub	cham	autoc	zoo
Croton campestris A. St.-Hil.	AA416	-	-	1	1	subshrub	cham	autoc	zoo
Croton goyazensis Müll. Arg.	AA14	-	-	1	1	subshrub	cham	autoc	zoo
Dalechampia caperonioides Baill.	AA6	1	1	1	1	herb	hem	autoc	zoo
Euphorbia potentilloides Boiss.	CM733	1	1	1	-	herb	hem	autoc	zoo
Euphorbia sp.	CM731	-	-	1	-	subshrub	cham	autoc	zoo
Maprounea guianensis Aubl.	AA323	-	-	-	1	shrub	ph	autoc	zoo
Sapium glandulosum (L.) Morong	AA343	-	-	-	1	subshrub	cham	autoc	zoo
Fabaceae									
Acosmium dasycarpum (Vogel) Yakovlev	AA179	-	-	-	1	shrub	ph	autoc	zoo
Aeschynomene falcata (Poir) DC.	CM1068	-	-	1	-	herb	hem	anemoc	zoo
Aeschynomene paniculata Vogel	AA192	-	-	-	1	subshrub	cham	anemoc	zoo
Bauhinia dumosa Benth.	AA633	-	-	-	1	shrub	ph	autoc	zoo
Bauhinia rufa (Bong.) Steud	AA195	-	-	-	1	shrub	ph	autoc	zoo
Bauhinia sp.	CM1463	-	-	1	-	subshrub	cham	autoc	zoo
Calliandra dysantha Benth.	CM1336	-	1	1	-	subshrub	cham	autoc	zoo
Chamaecrista cathartica (Mart.) H.S. Irwin and Barneby	AA190	-	1	1	1	subshrub	cham	autoc	zoo
Chamaecrista conferta (Benth.) H.S.Irwin and Barneby	CM1176	1	-	-	-	subshrub	cham	autoc	zoo
Chamaecrista crommyotricha (Harms) H.S. Irwin and Barneby	AA30	-	-	-	1	subshrub	cham	autoc	zoo
Chamaecrista desvauxii (Collad.) Killip	CM866	-	-	1	-	subshrub	cham	autoc	zoo
Chamaecrista desvauxii var. *langsdorffii* (Vogel) H.S. Irwin and Barneby	AA708	-	-	1	1	subshrub	cham	autoc	zoo
Chamaecrista pohliana (Benth) H.S. Irwin and Barneby	AA388	1	1	1	1	subshrub	cham	autoc	zoo
Chamaecrista sp.	CM1063	-	-	1	-	subshrub	cham	autoc	zoo
Crotalaria cf. *goiasensis* Windler and S.G. Skinner	CM2475	1	-	1	-	subshrub	cham	autoc	zoo
Clitoria guianensis (Aubl.) Benth.	CM2055	-	-	1	-	herb	hem	autoc	zoo
Crotalaria flavicoma Benth.	AA832	-	-	1	1	subshrub	cham	autoc	zoo
Crotalaria unifoliolata Benth.	AA1486	-	-	1	1	subshrub	cham	autoc	zoo
Crotalaria sp.	CM855	-	-	1	-	subshrub	cham	autoc	zoo
Desmodium barbatum (L.) Benth.	AA1306	-	1	-	-	subshrub	cham	autoc	zoo
Desmodium platycarpum Benth.	CM1896	-	-	1	-	subshrub	cham	autoc	zoo
Eriosema defoliatum Benth.	AA8	1	1	1	1	subshrub	cham	autoc	zoo
Eriosema glabrum Benth.	AA847	-	-	-	1	subshrub	hem	autoc	zoo
Galactia crassifolia (Benth.) Taub.	AA37	-	-	-	1	subshrub	cham	autoc	zoo
Galactia grewiifolia (Benth.) Taub.	AA332	1	-	1	1	subshrub	cham	autoc	zoo
Galactia peduncularis Benth. (Taub)	AA742	-	-	1	1	herb	hem	autoc	zoo
Galactia stereophylla Harms	AA61	-	1	1	1	herb	hem	autoc	zoo
Galactia sp.	AA1891	-	-	-	1	subshrub	cham	autoc	zoo
Lupinus velutinus Benth.	AA759	-	-	1	1	shrub	ph	autoc	zoo
Mimosa albolanata Taub.	AA1799	-	1	1	1	shrub	ph	autoc	zoo
Mimosa albolanata var. brasiliana Barneby	AA36	-	-	-	1	shrub	ph	autoc	zoo
Mimosa gracilis Benth.	s/no	-	-	1	-	subshrub	cham	autoc	zoo
Mimosa lanuginosa Burkart	AA94	-	-	1	1	subshrub	cham	autoc	zoo
Mimosa nuda Benth. var. *glaberrima* (Chodat and Hassl.) Barneby	AA524	-	-	1	1	herb	hem	autoc	zoo
Mimosa radula Benth. var *imbricata* (Benth.) Barneby	AA739	-	-	1	1	subshrub	cham	autoc	zoo

Table 1. *Continued.*

SPECIES	VOUCHER	CLT0	CLT1	CST0	CST1	Habit	LF	DS	PS
Mimosa setosa Benth.	AA1348	1	-	1	1	subshrub	cham	autoc	zoo
Mimosa setosa Benth. subsp. *setosa*	AA244	-	-	-	1	subshrub	cham	autoc	zoo
Mimosa somnians Willd.	AA612	-	-	-	1	shrub	ph	autoc	zoo
Mimosa somnians Willd. subsp. *viscida* (Willd.) Barneby var. *leptocaulis* (Benth.) Barneby	AA1098	-	-	-	1	subshrub	cham	autoc	zoo
Mimosa xanthocentra Mart. subsp. *tremula* (Benth.) Barneby var. *tremula*	AA844	-	-	1	1	subshrub	cham	autoc	zoo
Senna rugosa (G. Don) H.S. Irwin and Barneby	AA1234	-	-	1	1	shrub	ph	autoc	zoo
Stylosanthes guianensis (Aubl.) Sw.	AA2	-	-	1	1	subshrub	cham	autoc	zoo
Vigna cf. *linearis* (Kunth) Marechal and al.	CM1000	1	-	-	-	vine	lia	autoc	zoo
Zornia gemella (Willd.) Vogel	AA1023	-	-	-	1	subshrub	cham	autoc	zoo
Zornia vestita Mohlenbr.	AA622	-	-	1	1	subshrub	cham	autoc	zoo
Zornia virgata Moric.	AA975	-	-	1	1	subshrub	cham	autoc	zoo
Zornia sp.	AA1232	-	-	-	1	subshrub	cham	autoc	zoo
Gentianaceae									
Chelonanthus purpurascens (Aubl.) Struwe, S. Nilsson and V.A. Albert	AA1058	-	1	-	-	subshrub	cham	autoc	zoo
Curtia tenuifolia (Aubl.) Knobl.	AA1180	1	1	-	-	herb	ter	anemoc	zoo
Deianira chiquitana Herzog	AA31	1	1	1	1	subshrub	cham	autoc	zoo
Deianira nervosa Cham. and Schltdl.	CM1335	-	-	1	-	herb	hem	autoc	zoo
Irlbachia speciosa (Cham. and Schltdl.) Maas	AA165	-	1	1	1	subshrub	cham	anemoc	zoo
Schultesia gracilis Mart.	AA1164	1	1	-	-	herb	hem	autoc	zoo
Schultesia guianensis (Aubl.) Malme	AA1124	-	1	-	1	herb	hem	autoc	zoo
Gesneriaceae									
Sinningia allagophylla (Mart.) Wiehler	AA857	-	1	-	1	herb	hem	anemoc	zoo
Sinningia elatior (Kunth)Chautems	AA557	1	1	-	-	subshrub	cham	anemoc	zoo
Iridaceae									
Sisyrinchium restioides Spreng.	AA1259	1	1	1	1	herb	hem	autoc	zoo
Sisyrinchium vaginatum Spreng.	AA1009	1	1	-	1	herb	hem	autoc	zoo
Trimezia juncifolia (Klatt.) Benth. and Hook. f.	CM1121	1	-	-	-	herb	geo	autoc	zoo
Lamiaceae									
Amasonia hirta Benth.	CM1222	-	-	1	-	subshrub	cham	autoc	zoo
Eriope complicata Mart. ex Benth.	CM746	-	-	1	-	shrub	ph	autoc	zoo
Eriope crassipes Benth.	CM1952	-	-	1	-	herb	hem	autoc	zoo
Hypenia brachystachys (Pohl ex Benth.) Harley	AA16	-	1	1	1	subshrub	cham	autoc	zoo
Hyptis carpinifolia Benth.	AA1468	1	1	-	1	shrub	ph	autoc	zoo
Hyptis crenata Pohl ex Benth.	AA625	-	-	-	1	herb	hem	autoc	zoo
Hyptis crinita Benth.	AA1460	-	-	1	1	subshrub	cham	autoc	zoo
Hyptis cuneata Pohl ex Benth.	AA1350	-	1	1	1	subshrub	cham	autoc	zoo
Hyptis lavandulacea Pohl ex Benth.	AA1431	-	1	-	-	subshrub	cham	autoc	zoo
Hyptis linarioides Pohl ex Benth.	AA286	1	1	-	-	subshrub	cham	autoc	zoo
Hyptis loeseneriana Pilg.[+]	AA32	-	-	-	1	subshrub	cham	autoc	zoo
Hyptis nudicaulis Benth.	AA896	-	-	1	1	herb	hem	autoc	zoo
Hyptis orbiculata Pohl ex Benth.	AA214	-	1	-	-	subshrub	cham	autoc	zoo
Hyptis peduncularis Benth.	CM1234	-	-	1	-	herb	hem	autoc	zoo
Hyptis subrotunda Pohl ex Benth.	AA320	1	1	-	-	subshrub	cham	autoc	zoo
Hyptis subviolacea Briq.	CM1940	-	-	1	-	herb	hem	autoc	zoo
Hyptis tenuifolia Epling[+]	AA823	-	-	1	1	subshrub	cham	autoc	zoo
Hyptis villosa Pohl ex Benth.	AA99	-	1	1	1	herb	hem	autoc	zoo
Marsypianthes montana Benth.	CM2064	-	-	1	-	shrub	ph	autoc	zoo
Rhabdocaulon denudatum (Benth.) Epling	AA28	1	1	1	1	herb	hem	autoc	zoo
Salvia brevipes Benth.	CM2086	-	-	1	-	herb	hem	autoc	zoo
Lauraceae									
Cassytha filiformis L.	AA114	-	1	-	1	vine	lia	zooc	zoo
Lentibulariaceae									
Utricularia amethystina Salzm. ex A. St.-Hil. and F. Girard	AA678	1	1	-	-	herb	ter	autoc	zoo
Utricularia hispida Lam.	AA142	-	1	-	-	herb	hem	autoc	zoo
Utricularia neottioides A. St.-Hil. and Girard	AA539	-	1	-	-	herb	hem	autoc	zoo
Lythraceae									
Cuphea ferruginea Pohl ex Koehne	AA737	-	-	-	1	subshrub	cham	autoc	zoo

Table 1. *Continued.*

SPECIES	VOUCHER	CLT0	CLT1	CST0	CST1	Habit	LF	DS	PS
Cuphea linarioides Cham. and Schltdl.	AA386	1	1	1	1	subshrub	cham	autoc	zoo
Cuphea spermacoce A. St.-Hil.	AA86	1	-	1	1	subshrub	cham	autoc	zoo
Diplusodon oblongus Pohl	AA396	-	-	-	1	subshrub	cham	autoc	zoo
Diplusodon sessiliflorus Koehne	AA977	-	-	1	1	subshrub	cham	autoc	zoo
Diplusodon villosus Pohl	AA698	-	-	1	1	subshrub	cham	autoc	zoo
Diplusodon virgatus Pohl	CM1302	1	-	-	-	shrub	ph	autoc	zoo
Malpighiaceae									
Banisteriopsis campestris (A. Juss.) Little	AA70	-	1	1	1	shrub	ph	anemoc	zoo
Banisteriopsis irwinii B. Gates	AA1874	-	1	-	-	shrub	ph	anemoc	zoo
Banisteriopsis laevifolia (A. Juss.) B. Gates	AA513	-	-	-	1	shrub	ph	anemoc	zoo
Banisteriopsis megaphylla (A. Juss.) B. Gates	CM2437	1	-	-	-	shrub	ph	anemoc	zoo
Banisteriopsis variabilis B. Gates	AA1266	-	-	-	1	shrub	ph	anemoc	zoo
Byrsonima basiloba A. Juss.	AA721	-	-	1	1	subshrub	cham	zooc	zoo
Byrsonima guilleminiana A. Juss.	AA96	-	1	-	1	shrub	ph	zooc	zoo
Byrsonima pachyphylla A. Juss.	AA837	-	1	1	1	shrub	ph	zooc	zoo
Byrsonima rigida A. Juss.	AA402	-	-	1	1	subshrub	cham	zooc	zoo
Byrsonima subterranea Brade and Markgr.	AA189	-	-	1	1	shrub	ph	zooc	zoo
Heteropterys byrsonimifolia A. Juss.	AA209	-	1	-	-	shrub	ph	anemoc	zoo
Heteropterys campestris A. Juss.	AA56	-	-	1	1	shrub	ph	anemoc	zoo
Peixotoa goiana C.E. Anderson	AA19	-	-	1	1	subshrub	cham	anemoc	zoo
Peixotoa sp.	CM1039	-	-	1	-	subshrub	cham	anemoc	zoo
Pterandra pyroidea A. Juss.	AA90	-	-	-	1	subshrub	cham	anemoc	zoo
Tetrapterys ambigua (A. Juss.) Nied.	AA163	1	-	1	1	shrub	ph	anemoc	zoo
Malvaceae									
Byttneria scalpellata Pohl	AA825	-	-	1	1	subshrub	cham	autoc	zoo
Byttneria sp.	AA976	-	-	-	1	subshrub	cham	autoc	zoo
Melochia spicata (L.) Fryxell	AA711	-	-	-	1	subshrub	cham	autoc	zoo
Pavonia rosa-campetris A. St.-Hil.	s/no	-	-	1	-	subshrub	cham	zooc	zoo
Peltaea lasiantha Krapov. and Cristobal	AA629	-	-	1	1	subshrub	cham	zooc	zoo
Peltaea trinervis (C. Presl) Krapov. and Cristóbal	AA582	-	1	-	-	subshrub	cham	zooc	zoo
Peltaea sp.	CM2469	-	-	1	-	subshrub	cham	zooc	zoo
Sida linifolia Juss. ex Cav.	AA65	1	-	-	1	subshrub	cham	autoc	zoo
Waltheria communis A. St.-Hil.	CM1944	-	-	1	-	herb	hem	autoc	zoo
Melastomataceae									
Cambessedesia espora DC.	AA5	-	-	1	1	herb	hem	autoc	zoo
Cambessedesia hilariana (Kunth) DC.	AA395	-	-	-	1	subshrub	cham	autoc	zoo
Clidemia capitellata (Bonpl.) D. Don	s/no	1	-	-	-	shrub	ph	zooc	zoo
Comolia lanceaeflora Triana	AA905	1	1	-	-	subshrub	cham	autoc	zoo
Desmoscelis villosa (Aubl.) Naudin	AA1304	1	1	-	-	shrub	ph	autoc	zoo
Lavoisiera bergii Cogn.	AA136	-	1	-	-	shrub	ph	autoc	zoo
Leandra deflexa Cogn.	AA200	-	1	-	-	shrub	ph	zooc	zoo
Leandra erostrata (DC.) Cogn.	AA125	-	1	-	-	shrub	ph	zooc	zoo
Leandra polystachya (Naudin) Cogn.	AA864	1	1	-	1	subshrub	cham	zooc	zoo
Macairea radula (Bonpl.) DC.	AA134	-	1	-	-	shrub	ph	autoc	zoo
Meisneria cordata (Pohl ex DC.) Triana	AA1556	-	1	1	1	herb	hem	autoc	zoo
Miconia albicans (Sw.) Steud.	AA3	-	1	-	1	shrub	ph	zooc	zoo
Miconia chamissois Naudin	AA129	-	1	-	-	shrub	ph	zooc	zoo
Microlicia euphorbioides Mart.	AA1127	-	1	-	1	subshrub	cham	autoc	zoo
Microlicia helvola (Spreng.) Triana	AA127	-	1	-	-	subshrub	cham	autoc	zoo
Microlicia polystemma Naudin	AA203	1	1	-	-	subshrub	cham	autoc	zoo
Ossaea congestiflora Cong.	AA627	-	-	-	1	shrub	ph	zooc	zoo
Pterolepis repanda (DC.) Triana	AA966	-	-	-	1	subshrub	cham	autoc	zoo
Rhynchanthera grandiflora (Aubl.) DC.	AA138	1	1	-	-	shrub	ph	autoc	zoo
Tibouchina aegopogon (Naudin) Cogn.	AA529	1	-	1	1	subshrub	cham	autoc	zoo
Tibouchina gracilis (Bonpl.) Cogn.	AA632	1	1	1	1	subshrub	cham	autoc	zoo
Tibouchina stenocarpa (DC.) Cogn.	AA906	-	1	-	-	shrub	ph	autoc	zoo
Tibouchina sp.	AA1056	-	1	-	-	subshrub	cham	autoc	zoo
Trembleya parviflora (D. Don) Cogn.	AA132	-	1	-	-	shrub	ph	autoc	zoo
Trembleya phlogiformis DC.	AA394	-	1	1	1	shrub	ph	autoc	zoo
Menispermaceae									

Table 1. *Continued.*

SPECIES	VOUCHER	CLT0	CLT1	CST0	CST1	Habit	LF	DS	PS
Cissampelos ovalifolia DC.	AA398	1	1	1	1	subshrub	cham	zooc	zoo
Moraceae									
Brosimum gaudichaudii Trécul	AA1602	-	1	-	-	shrub	ph	zooc	ane
Myrtaceae									
*Campomanesia adamantium (*Cambess.) O. Berg	AA64	-	-	1	1	shrub	ph	zooc	zoo
Campomanesia pubescens (Mart. ex DC.) O.Berg	CM1938	-	-	1	-	shrub	ph	zooc	zoo
Campomanesia xanthocarpa (Mart.) O. Berg.	AA246	-	-	1	1	shrub	ph	zooc	zoo
Eugenia calycina Cambess.	AA67	1	1	1	1	shrub	ph	zooc	zoo
Eugenia complicata O. Berg.	AA9	-	-	-	1	shrub	ph	zooc	zoo
Eugenia cristaensis O. Berg.	CM787	-	-	1	-	subshrub	cham	zooc	zoo
Eugenia klotzschiana O. Berg.	AA57	-	-	-	1	subshrub	cham	zooc	zoo
Eugenia myrcianthes Nied.	CM745	-	-	1	-	subshrub	cham	zooc	zoo
Eugenia punicifolia (Kunth) DC.	AA250	-	1	-	1	shrub	ph	zooc	zoo
Myrcia decorticans DC.	AA7	-	-	-	1	shrub	ph	zooc	zoo
Myrcia decrescens O. Berg.	AA169	1	1	1	1	herb	hem	zooc	zoo
Myrcia hiemalis Cambess.	CM1880	-	-	1	-	subshrub	cham	zooc	zoo
Myrcia lasiantha DC.	s/no	-	-	-	1	shrub	ph	zooc	zoo
Myrcia linearifolia Cambess.	s/no	-	-	1	-	subshrub	cham	zooc	zoo
Myrcia stricta O. Berg. (Kiaersk.)	AA72	-	-	-	1	subshrub	cham	zooc	zoo
Myrcia tomentosa (Aubl.) DC.	AA335	-	-	-	1	shrub	ph	zooc	zoo
Myrcia torta DC.	AA11	1	1	1	1	shrub	ph	zooc	zoo
Myrciaria cuspidata O.Berg	CM817	-	-	1	-	shrub	ph	zooc	zoo
Psidium firmum O. Berg.	AA12	-	1	-	1	shrub	ph	zooc	zoo
Psidium grandifolium Mart. ex DC.	AA518	-	-	-	1	shrub	ph	zooc	zoo
Psidium laruotteanum Cambess.	AA406	-	-	-	1	shrub	ph	zooc	zoo
Ochnaceae									
Ouratea floribunda Engl.	AA83	-	1	1	1	subshrub	cham	zooc	zoo
Sauvagesia linearifolia A. St.-Hil	AA1554	1	1	-	1	herb	hem	autoc	zoo
Sauvagesia racemosa A. St.-Hil	AA122	1	1	-	-	subshrub	cham	autoc	zoo
Onagraceae									
Ludwigia nervosa (Poir.) H. Hara	AA130	1	1	-	-	shrub	ph	anemoc	zoo
Ludwigia tomentosa (Cambess.) H. Hara	AA1854	-	1	-	-	shrub	ph	anemoc	zoo
Orchidaceae									
Cleistes sp.	CM2213	1	-	-	-	herb	hem	autoc	zoo
Epistephium sclerophyllum Lindl.	AA1357	-	1	1	1	herb	geo	autoc	zoo
Habenaria ayangannensis Renz	AA1110	-	-	-	1	herb	hem	anemoc	zoo
Habenaria heringeri Pabst	AA647	-	-	-	1	herb	hem	anemoc	zoo
Habenaria nuda Lindl.	s/no	1	-	1	-	herb	geo	anemoc	zoo
Habenaria cf. *urbaniana* Cogn.	CM1495	1	-	-	-	herb	hem	anemoc	zoo
Orobanchaceae									
Buchnera juncea Cham. and Schltdl.	AA1440	-	1	-	-	herb	hem	anemoc	zoo
Buchnera lavandulacea Cham. and Schldl.	CM906	1	-	-	-	herb	hem	anemoc	zoo
Buchnera rosea Kunth	CM1041	-	-	1	-	herb	hem	anemoc	zoo
Escobedia grandiflora (L. f.) Kuntze	AA1062	-	1	-	-	subshrub	cham	autoc	zoo
Esterhazya splendida J.C. Mikan	AA1373	-	-	1	1	shrub	ph	autoc	zoo
Melasma sp.	CM1575	1	-	-	-	herb	hem	autoc	zoo
Oxalidaceae									
Oxalis confertifolia (Kuntze) R. Knuth	AA4	1	1	1	1	subshrub	cham	autoc	zoo
Oxalis cordata A. St.-Hil.	AA647	-	-	-	1	subshrub	cham	autoc	zoo
Oxalis suborbiculata Lourteig	AA74	-	-	1	1	subshrub	cham	autoc	zoo
Passifloraceae									
Passiflora amethystina J.C. Mikan	AA1066	-	1	-	-	vine	lia	zooc	zoo
Passiflora clathrata Mast.	AA285	-	1	-	-	subshrub	cham	zooc	zoo
Piriqueta sidifolia (A. St.-Hil. and A. Juss. and Cambess.) Urb.	AA1002	1	-	1	1	subshrub	cham	zooc	zoo
Turnera longiflora Cambess.	AA242	-	-	-	1	subshrub	cham	autoc	zoo
Turnera oblongifolia Cambess.	AA390	1	1	1	1	herb	hem	autoc	zoo
Piperaceae									
Piper fuligineum Kunth	AA1061	-	1	-	-	shrub	ph	zooc	zoo
Poaceae									
Agenium leptocladum (Hack.) Clayton	AA119	-	1	-	1	herb	hem	anemoc	ane

Table 1. *Continued.*

SPECIES	VOUCHER	CLT0	CLT1	CST0	CST1	Habit	LF	DS	PS
Andropogon bicornis L.	AA887	1	1	1	1	herb	hem	zooc	ane
Andropogon lateralis Nees.	AA530	1	1	-	1	herb	hem	anemoc	ane
Andropogon lateralis subsp. *cryptopus* (Hack.) A. Zanin	CM754	1	-	-	-	herb	hem	anemoc	ane
Andropogon leucostachyus Kunth	AA501	1	1	1	1	herb	hem	anemoc	ane
Andropogon selloanus (Hack.) Hack.	CM796	1	-	-	-	herb	hem	anemoc	ane
Andropogon virgatus Desv.	AA197	1	1	1	1	herb	hem	anemoc	ane
Aristida recurvata Kunth	AA15	-	-	1	1	herb	hem	anemoc	ane
Aristida riparia Trin.	AA1026	-	1	1	1	herb	hem	anemoc	ane
Aristida setifolia Kunth	AA35	-	-	1	1	herb	hem	anemoc	ane
Aristida sp.	CM1693	-	-	1	-	herb	hem	anemoc	ane
Arthropogon filifolius Filg.	AA313	1	1	-	-	herb	hem	anemoc	ane
Arthropogon villosus Nees	CM2077	1	-	1	-	herb	hem	anemoc	ane
Arthropogon sp.	AA1826	-	1	-	-	herb	hem	anemoc	ane
Arundinella hispida (Willd.) Kuntze	AA35	1	1	1	1	herb	hem	anemoc	ane
Axonopus aureus P. Beauv.	AA1877	-	1	1	1	herb	hem	anemoc	ane
Axonopus brasiliensis (Spreng.) Kuhlm.	AA882	1	1	1	1	herb	hem	anemoc	ane
Axonopus comans (Doll) Kuhlm.	AA284	1	1	-	-	herb	hem	anemoc	ane
Axonopus marginatus (Trin.) Chase ex Hitchc.	AA657	-	1	1	1	herb	hem	anemoc	ane
Axonopus siccus (Nees) Kuhlm.	AA728	-	-	1	1	herb	hem	autoc	ane
Axonopus sp.	CM2142	1	-	-	-	herb	hem	anemoc	ane
Ctenium cf. *brachystachyum* (Nees) Kunth	CM742	1	-	-	-	herb	hem	anemoc	ane
Ctenium cirrhosum (Nees) Kunth	AA1407	1	1	1	1	herb	hem	anemoc	ane
Digitaria sp.	CM1365	-	-	1	-	herb	hem	anemoc	ane
Echinolaena inflexa (Poir.) Chase	AA41	1	1	1	1	herb	hem	zooc	zoo
Elionurus muticus (Spreng.) Kuntze	CM750	1	1	1	-	herb	hem	anemoc	ane
Eragrostis maypurensis (Kunth) Steud.	AA1280	-	-	1	1	herb	hem	zooc	ane
Eriochrysis cayennensis P. Beauv.	AA603	-	1	-	-	herb	hem	anemoc	ane
Hyparrhenia bracteata (Humb. and Bonpl. ex Willd.) Stapf.	AA1497	1	1	-	1	herb	hem	anemoc	ane
Ichnanthuschamporum Swallen	AA731	-	1	1	1	herb	hem	zooc	ane
Ichnanthus procurrens (Nees ex Trin.) Swallen	AA374	-	1	-	-	herb	hem	zooc	ane
Lasiacis standleyi Hitchc.	CM1969	1	-	-	-	herb	hem	anemoc	ane
Leptocoryphium lanatum (Kunth) Nees	AA429	-	-	1	1	herb	hem	anemoc	ane
Melinis minutiflora P. Beauv.*	AA110	-	-	-	1	herb	hem	anemoc	ane
Melinis repens (Willd.) Zizka.*	AA725	1	1	1	1	herb	hem	anemoc	ane
Mesosetum ferrugineum (Trin.) Chase	CM757	1	-	-	-	herb	hem	anemoc	ane
Mesosetum loliiforme (Steud.) Hitchc.	AA875	-	-	-	1	herb	hem	anemoc	ane
Otachyrium seminudum Send. and Soderstr.	CM2283	1	1	1	-	herb	hem	autoc	ane
Panicum caaguazuense Henrard	AA1617b	-	1	-	-	herb	hem	zooc	ane
Panicum cyanescens Nees ex Trin.	AA648	1	-	1	1	herb	hem	zooc	ane
Panicum olyroides Kunth	s/no	-	-	1	1	herb	hem	zooc	ane
Panicum olyroides Kunth. var *olyroides*	AA537	-	1	-	1	herb	hem	zooc	ane
Panicum parvifolium Lam.	AA913	1	1	-	-	herb	hem	zooc	ane
Panicum peladoense Henrard	AA726	-	-	1	1	herb	hem	zooc	ane
Paspalum ammodes Trin.	CM2131	-	-	1	-	herb	hem	anemoc	ane
Paspalum dedeccae Quarín	AA297	1	1	-	-	herb	hem	anemoc	ane
Paspalum ellipticum Döll	CM751	1	-	1	-	herb	hem	anemoc	ane
Paspalum erianthum Nees ex Trin.	CM1960	1	-	-	-	herb	hem	anemoc	ane
Paspalum gardnerianum Nees	AA44	1	1	1	1	herb	hem	zooc	ane
Paspalum geminiflorum Steud.	CM1017	1	-	1	-	herb	hem	anemoc	ane
Paspalum glaucescens Hack.	AA46	1	-	-	1	herb	hem	anemoc	ane
Paspalum hyalinum Nees ex Trin.	CM1326	1	-	-	-	herb	hem	anemoc	ane
Paspalum imbricatum Filg.	AA806	1	1	-	-	herb	hem	anemoc	ane
Paspalum lineare Trin.	s/no	1	-	-	-	herb	hem	anemoc	ane
Paspalum maculosum Trin.	AA1035	1	1	1	1	herb	hem	anemoc	ane
Paspalum pectinatum Nees ex Trin.	CM762	1	-	1	-	herb	hem	autoc	ane
Paspalum pilosum Lam.	AA1035	-	-	1	1	herb	hem	anemoc	ane
Paspalum polyphyllum Nees ex Trin.	CM1022	1	1	1	-	herb	hem	anemoc	ane
Paspalum reduncum Nees ex Steud.	AA1159	-	-	1	1	herb	ter	anemoc	ane
Paspalum stellatum Flüeggé	AA113	1	1	1	1	herb	hem	anemoc	ane
Paspalum trichotomum Hack.	AA1662	-	-	-	1	herb	hem	anemoc	ane

Table 1. *Continued.*

SPECIES	VOUCHER	CLT0	CLT1	CST0	CST1	Habit	LF	DS	PS
Pennisetum nervosum (Nees) Trin.	CM1218	-	-	1	-	herb	hem	anemoc	ane
Pennisetum polystachion (L.) Schult.	AA730	-	-	1	1	herb	hem	anemoc	ane
Saccharum asperum (Nees) Steud.	AA152	-	1	-	-	herb	hem	anemoc	ane
Sacciolepis myuros (Lam.) Chase	AA571	-	1	-	-	herb	hem	autoc	ane
Schizachyrium condensatum (Kunth) Nees	AA1155	1	1	1	1	herb	hem	anemoc	ane
Schizachyrium sanguineum (Retz.) Alston	AA1410	-	1	-	1	herb	hem	anemoc	ane
Schizachyrium tenerum Nees	CM1386	-	-	1	-	herb	hem	anemoc	ane
Schizachyrium sp.	CM1214	1	-	-	-	herb	hem	anemoc	ane
Setaria parviflora (Poir.) M. Kerguelen	AA880	-	1	1	1	herb	ter	zooc	ane
Sorghastrum nutans (L.) Nash	AA1278	-	-	-	1	herb	hem	anemoc	ane
Sporobolus reflexus Boechat and Longhi-Wagner	CM763	1	-	1	-	herb	hem	anemoc	ane
Trachypogon macroglossus Trin.	AA1661	-	-	-	1	herb	hem	zooc	ane
Trachypogon spicatus (L.f.) Kuntze	CM1387	-	-	1	-	herb	hem	zooc	ane
Tristachya leiostachya Nees	AA431	-	1	1	1	herb	hem	zooc	ane
Polygalaceae									
Monnina oblongifolia Arechav.	AA278	1	-	1	1	subshrub	cham	anemoc	zoo
Polygala abreui Marques and J.F.B. Pastore	AA216	-	1	-	-	herb	hem	zooc	zoo
Polygala carphoides Chodat	CM953	1	-	-	-	herb	ter	zooc	zoo
Polygala celosioides Mart. ex A.W. Benn.	AA1889	-	-	-	1	herb	ter	zooc	zoo
Polygala cuspidata DC.	CM1012	-	-	1	-	herb	hem	zooc	zoo
Polygala cf. *fendleri* Chodat	CM2442	1	-	-	-	herb	ter	autoc	zoo
Polygala galioides Poir.	AA830	1	1	-	1	herb	ter	autoc	zoo
Polygala harleyi M.C.M. Marques	CM1177a	1	-	-	-	herb	hem	autoc	zoo
Polygala hygrophila Kunth	AA963	1	-	-	-	herb	ter	autoc	zoo
Polygala juncea A. St.-Hil.[+]	CM2061	-	-	1	-	herb	hem	autoc	zoo
Polygala longicaulis Kunth	AA819	1	1	1	1	herb	ter	autoc	zoo
Polygala martiana A.W. Benn.	AA399	1	-	1	1	herb	hem	anemoc	zoo
Polygala misella Bernardi	AA1040	1	1	-	-	herb	ter	autoc	zoo
Polygala pseudosericea Chodat	CM795	1	-	-	-	herb	hem	autoc	zoo
Polygala subtilis Kunth	CM972	1	-	-	-	herb	ter	autoc	zoo
Polygala tenella Willd.	CM1199	1	-	-	-	herb	ter	autoc	zoo
Polygala tenuis DC.	AA81	1	1	1	1	herb	hem	autoc	zoo
Polygala timoutou Aubl.	CM1314	1	-	-	-	herb	ter	autoc	zoo
Pteromonnina stenophylla (A. St-Hil.) B. Eriksen	AA221	1	1	-	-	subshrub	cham	zooc	zoo
Rhamnaceae									
Crumenaria choretroides Martius ex Reisseck	CM737	-	-	1	-	herb	hem	anemoc	zoo
Crumenaria erecta Reissek	CM1808	-	-	1	-	herb	hem	autoc	zoo
Rubiaceae									
Chomelia ribesioides Benth. ex A. Gray	AA256a	-	-	-	1	shrub	ph	zooc	zoo
Declieuxia cordigera var. *cordigera*	CM2164	-	-	1	-	herb	hem	autoc	zoo
Declieuxia fruticosa (Willd. ex Roem. and Schult.) Kuntze	AA998	-	-	-	1	subshrub	cham	autoc	zoo
Galianthe grandifolia E.L. Cabral	AA862	-	1	1	1	subshrub	cham	autoc	zoo
Galianthe ramosa E.L. Cabral	AA474	-	-	1	1	subshrub	cham	autoc	zoo
Galianthe verbenoides Cham. and Schltdl.	AA46	-	-	-	1	subshrub	cham	autoc	zoo
Mitracarpus frigidus (Willd. ex Roem. and Schult.) K. Schum.	CM1358	-	-	1	-	herb	hem	autoc	zoo
Palicourea coriacea (Cham.) K. Schum.	AA22	-	-	1	1	subshrub	cham	zooc	zoo
Palicourea officinalis Mart.	AA43	-	1	1	1	subshrub	cham	zooc	zoo
Palicourea rigida Kunth	AA516a	-	-	-	1	shrub	ph	zooc	zoo
Richardia scabra L.	CM1014	-	-	1	-	herb	hem	zooc	zoo
Sabicea brasiliensis Wernham	AA69	-	1	1	1	subshrub	cham	zooc	zoo
Spermacoce irwiniana (E.L. Cabral) Delprete[+]	AA1769	1	-	-	1	herb	hem	autoc	zoo
Spermacoce latifolia Aubl.	AA397	1	1	-	1	subshrub	cham	autoc	zoo
Spermacoce marticrovettiana (E.L.Cabral) Govaerts	CM1680	1	-	1	-	herb	hem	autoc	zoo
Spermacoce ocymoides Burm. f.	AA599	-	1	-	-	herb	hem	autoc	zoo
Spermacoce poaya A. St.-Hil.	AA417	1	-	1	1	subshrub	ter	autoc	zoo
Spermacoce tenella (Kunth) Cham. and Schltdl.	AA1253	1	-	1	1	herb	hem	autoc	zoo
Spermacoce sp.	CM2069a	-	-	1	-	subshrub	cham	autoc	zoo
Staelia capitata K. Schum.	CM1347	-	-	1	-	subshrub	cham	autoc	zoo
Tocoyena formosa (Cham. and Schltdl.) K. Schum.	AA334	-	-	1	1	shrub	ph	zooc	zoo
Salicaceae									

Table 1. *Continued.*

SPECIES	VOUCHER	CLT0	CLT1	CST0	CST1	Habit	LF	DS	PS
Casearia sylvestris Sw.	AA42	-	-	1	1	shrub	ph	autoc	zoo
Santalaceae									
Thesium brasiliense A. DC.	CM974	1	-	-	-	herb	ter	zooc	zoo
Sapindaceae									
Serjania erecta Radlk.	AA492	-	1	-	1	vine	cham	autoc	zoo
Serjania lethalis A. St.-Hil.	AA109	-	1	-	1	vine	lia	anemoc	Zoo
Simaroubaceae									
Simaba suffruticosa Engl.	AA55	-	-	1	1	subshrub	cham	zooc	zoo
Siparunaceae									
Siparuna brasiliensis (Spreng.) A. DC.	AA25	-	1	-	-	shrub	ph	zooc	zoo
Smilacaceae									
Smilax goyazana A. DC.	AA25	-	-	1	1	vine	lia	zooc	zoo
Solanaceae									
Brunfelsia obovata Benth.	AA131	-	1	-	-	shrub	ph	autoc	zoo
Schwenckia americana Rooyen ex L.	AA1	-	-	-	1	herb	hem	autoc	zoo
Solanum americanum Mill.	CM2300	-	-	1	-	herb	hem	zooc	zoo
Solanum foederale M. Nee	AA382	-	-	-	1	herb	hem	zooc	zoo
Solanum lycocarpum A. St.-Hil.	AA383	-	-	-	1	shrub	ph	zooc	zoo
Solanum subumbellatum Vell.	AA183	1	1	1	1	subshrub	cham	zooc	zoo
Symplocaceae									
Symplocos crenata (Vell.) Mattos	AA1593	-	1	-	-	shrub	ph	zooc	zoo
Verbenaceae									
Lippia corymbosa Cham.	CM1658	1	-	1	-	subshrub	cham	autoc	zoo
Lippia lacunosa Mart. and Schauer	AA1514	-	1	-	-	subshrub	cham	autoc	zoo
Lippia lupulina Cham.	AA738	-	-	1	1	subshrub	cham	autoc	zoo
Lippia martiana Schauer	CM870	-	-	1	-	subshrub	cham	autoc	zoo
Lippia rotundifolia Cham.	AA1772	-	1	-	1	shrub	ph	autoc	zoo
Lippia sericea Cham.	AA1341	-	-	-	1	subshrub	cham	autoc	zoo
Lippia sp.	CM1695	-	-	1	-	subshrub	cham	autoc	zoo
Stachytarpheta gesnerioides Cham.	CM845	-	-	1	-	subshrub	cham	autoc	zoo
Stachytarpheta longispicata (Pohl) S. Atkins	AA852	-	-	1	1	subshrub	cham	autoc	zoo
Stachytarpheta sp.	AA889	-	-	1	1	subshrub	cham	autoc	zoo
Violaceae									
Hybanthus lanatus (A. St.-Hil.) Baill.	CM781	-	-	1	-	herb	hem	autoc	zoo
Vitaceae									
Cissus erosa Rich.	AA490	-	-	1	1	vine	lia	zooc	zoo
Xyridaceae									
Abolboda poarchon Seub.	AA1453	1	1	-	-	herb	hem	anemoc	zoo
Xyris dawsonii L.B. Sm. and Downs	AA888	-	-	-	1	herb	hem	anemoc	zoo
Xyris diaphanobracteata Kral and Wand.+	AA1447	-	1	-	-	herb	hem	anemoc	zoo
Xyris fallax Malme	AA810	-	1	-	-	herb	hem	anemoc	zoo
Xyris filifolia L.A. Nilsson	AA1688	-	1	-	-	herb	hem	anemoc	zoo
Xyris guaranitica Malme	AA146	1	1	-	-	herb	ter	anemoc	zoo
Xyris hymenachne Mart.	AA929	1	1	-	-	herb	hem	anemoc	zoo
Xyris jupicai Rich.	AA104	1	1	-	1	herb	ter	anemoc	zoo
Xyris lacerata Pohl ex Seub.	AA144	-	1	-	-	herb	hem	anemoc	zoo
Xyris laxifolia Mart.	AA1093	-	1	-	-	herb	hem	anemoc	zoo
Xyris paculipoda Kral and Smith	AA1158	-	1	-	-	herb	hem	anemoc	zoo
Xyris roraimae Malme	AA1625	-	1	-	-	herb	hem	anemoc	zoo
Xyris savanensis Miq.	AA1208b	-	1	-	-	herb	hem	anemoc	zoo
Xyris schizachne Mart.	CM2278	1	1	1	-	herb	hem	anemoc	zoo
Xyris seubertii A. Nilsson	AA1816	-	-	-	1	herb	hem	anemoc	zoo
Xyris tortula Mart.	AA921	1	1	-	-	herb	hem	anemoc	zoo
Xyris sp.1	CM827	1	-	-	-	herb	hem	anemoc	zoo
Xyris sp.2	CM2044	1	-	-	-	herb	hem	anemoc	zoo
Xyris sp.3	AA1085	-	1	-	-	herb	hem	anemoc	zoo

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